Conjugate effects of radiation flux on double diffusive MHD free convection flow of a nanofluid over a power law stretching sheet

Abstract :

This study theoretically investigates the conjugate effects of radiation flux and magnetohydrodynamic (MHD) on free convection boundary layer flow of a nanofluid over a nonlinear stretching sheet. It is assumed that the magnetic Reynolds number is small enough and the sheet is stretched with a power law velocity under the effects of the magnetic field, the buoyancy parameter, and the solutal buoyancy parameter. The model used for the nanofluid incorporates the effects of Rosseland approximation, Brownian motion, and thermophoresis parameters. By using appropriate similarity transformations, the governing nonlinear partial differential equations are transformed into dimensionless form and numerically solved using an implicit finite difference scheme known as the Keller-box method. It is found that the variations of magnetic field, buoyancy parameter, solutal buoyancy parameter, and the power law velocity parameter have strong influence on the motion.